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MINERALOGY AND PETROGRAPHY.[1]

HUSSAK'S "DETERMINATION OF ROCK-FORMING MINERALS."—The appearance in English of any book which treats of the methods of the new geology, is a subject for congratulation on the part of those who believe that the use of the microscope will reveal much of interest in the development of the earliest history of the earth's life. The importance of microscopical petrography is shown in the fact that the leading geologists all over the world are devoting much of their time to the study of the mineralogical characteristics of the rocks which form the solid crust of our globe and to the changes which these rocks undergo under various conditions. It is a lamentable fact that, though so much is now being done in this field, but few good English text-books exist. The only works relating to this subject which have appeared in English are Zirkel's Microscopical Petrography[2] and Rutley's Study of Rocks.[3] Both of these treat more particularly of the classification of rocks and presuppose a knowledge of the elementary principles, by means of which their mineral constituents are recognized. It is with pleasure that we now welcome a third volume, which treats of the optical properties of minerals and the methods which are made use of in their detection. Dr. E. G. Smith, of Beloit, Wisconsin, has very recently translated[4] Dr. Hussak's little book, noticed in the April number of the NATURALIST. Unfortunately, the first part of the translation, which treats of the methods of investigation, the optical properties, etc., of minerals, is marred by clumsy constructions, due to the literalness with which the original text has been followed. Most of the errors which the German petrographers have pointed out have been allowed to remain uncorrected. In many cases the choice of expressions for words and phrases occurring in the original are misleading. "The entering face of the light" is used for "Eintrittsfläche" (p. 18), "shell-formed" for "Schalenförmig" (p. 90), and "springlings", for "Einsprenglinge" (p. 85). A few words are mistranslated, and one (Kolben) is not translated at all. Certain sections of orthorhombic minerals are spoken of as not extinguishing "for the most part according to their axial figures" (Figurenaxen) (p. 23). More serious than these are the errors which arise from the confusion of the optical axes with the axes of elasticity; of biaxial minerals with those which are doubly refracting; and finally of isotropic substances with those exhibiting parallel extinction. The second part is taken up with a tabular arrangement of the principal minerals which enter into the composition of rocks. These are placed vertically in groups, according as their cross-sections are isotropic, or show parallel or inclined extinction. These groups are again subdivided in accordance with the crystallographic systems. Opposite the name of each mineral are placed its chemical composition, specific gravity, characteristic cleavages, the ordinary forms of its cross-sections, its twinning laws, the character and strength of its double refraction, its colors under crossed nicols, its natural color and pleochroism, its structure, the minerals with which it is generally associated, its characteristic inclusions and decomposition products, and those peculiarities which distinguish it from other minerals of the same general appearance. In this part an immense amount of material is so arranged that with very little trouble the student can turn to the mineral whose properties he wishes to study, and find in a few brief sentences the characteristics by which it can be distinguished from all others. This part will prove of considerable use to all who are beginning the study of petrography, and whom such manuals as that of Rosenbusch would tend only to confuse and discourage. A great service has been rendered to all those to whom the material in Dr. Hussak's book is inaccessible on account of the language in which it is written, and the translator deserves the thanks of all those interested in petrography for having placed within the reach of American students the elements of a branch of geology which is just beginning to be appreciated on this side of the Atlantic, as affording a key for the solution of many questions which have heretofore been considered as beyond the power of penetration.

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[1] Edited by W. S. BAYLEY, Johns Hopkins University, Baltimore, Md.

[2] Washington, 1876.

[3] London, 1879.

[4] New York: John Wiley & Sons, 1886.

PETROGRAPHICAL NEWS.—The relations of the bastite serpentine to the troktolite in the Belhelvie parish, in Aberdeenshire, are studied by Bonney, and the results of his investigations published in the *Geological Magazine*.[1] The serpentine is derived from an olivine-enstatite rock. The troktolite is a moderately coarse-grained mixture of purplish-gray or whitish feldspar and dull dark-green serpentine. At the junction of these two rocks, it was found that every grain of olivine was surrounded by a reactionary rim. The sequence of the two rocks in respect to age is not satisfactorily decided. In the same paper, the "Black Dog" rock, first mentioned by Heddle,[2] as a mass of rock about four yards long and broad, which projects from the sand on the shore, is described as containing fibrolite, iolite, quartz and mica. It bears a very close resemblance to some of the cordierite gneisses of Bavaria.——Küch describes[3] a quartz-pyroxene-andesite from the Cumbal in the Andes, in which the pyroxene constituent is principally hypersthene, and remarks that this mineral is a much more frequent constituent of the andesites of this region than has hitherto been supposed.——Quite an addition to our knowledge of the metamorphoric rocks has recently been made in the articles of Von Miklucho-Maclay[1] and Joseph Götz.[2] The former treats of the schists found on the River Witim, in East Siberia. These consist of altered gneisses, brown-spar phyllite, in which rhombohedra of brown spar are found enclosing all the other minerals, and even in some cases forming complete pseudomorphs of quartz, and brown-spar phyllite gneiss, which differs from the brown-spar phyllite in containing complete pseudomorphs of plagioclase after brown spar, and also in the enlargement of its quartz by the deposition of new quartz substance. Götz reports the results of his investigations on the rocks occurring in the neighborhood of the gold fields of Marabastad in Northern Transvaal. These he divides into gneiss, amphibole rocks, chlorite schists, phyllites, ottrelite and andalusite schists, quartzites, serpentine and proterobase. After a very careful study of the structure and mineralogical composition of all these rocks, he concludes that pressure is the cause of the schistosity of the schistose kinds, and that to this agency is due also the formation of the ottrelite and andalusite, which took place contemporaneously with the assumption of the schistosity. Thus much additional information is added to our knowledge of that sort of regional metamorphism, called by Lossen[3] dislocation metamorphism, to which so much attention is now being directed by the leading German petrographers.

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[1] October, 1885, p. 439.

[2] Mineralogical Magazine, v, p. 1.

[3] Neues Jahrb. für Min., etc., 1886, I, p. 35.

MINERALOGICAL NEWS.—In a late number of the Neues Jahrbuch,[4] Max Bauer publishes the continuation of his studies in mineralogy. In this paper he describes pseudomorphs of calcite after aragonite from Klein-Sachsenheim, in Württemberg. In all instances of this kind heretofore described the rhombic substance of the aragonite was supposed to have undergone a molecular rearrangement and thus to have passed over into rhombohedral calcite. A study of the Klein-Sachsenheimer crystals and the mode of their occurrence shows, however, that in some cases at least, a solution and deposition takes place. These crystals are found in a drusy dolomite, which originally contained in it lens-shaped masses of gypsum. This gypsum has been removed by water, and it was from this solution that the aragonite was deposited on the sides of the hollows left.[5] At the same time, there was a deposition of brown spar, which covered the little crystals of aragonite and protected them from the dissolving action of fresh supplies of water. Wherever an imperfection in the covering allowed water to gain access to the aragonite substance, a concentrated solution of this was formed and the salt was redeposited as calcite. Its external form, of course, was occasioned by the shell of brown spar, which remained undissolved. In nearly every case studied, an internal kernel of aragonite was surrounded by an external covering of calcite, showing that the change took place from without. The author thinks that many other cases of paramorphism may be explained by supposing a solution and redeposition of the material in the same way as that described.——Davreuxite, hydrous anthophyllite and hydrotephroïte have recently been investigated by Lacroix.[1] The first he describes as having all the optical properties of a mica. It is biaxial, with a negative bisectrix. It occurs in little plates, mixed with quartz grains in the quartziferous veins in the schists at Ottré. Hydrous anthophyllite (from Glen Urquhart, Scotland) is not a homogeneous substance, but is composed of fibers of actinolite, cemented together by a substance belonging to the chlorite group. Hydrotephroïte is a mixture in various proportions of at least three different substances. That which occurs in greatest quantity is colorless and biaxial and is probably tephroïte. The other substances are serpentine, chlorite and various manganese minerals. The hydrotephroïte is probably an altered tephroïte or some other manganese silicate.——Beautiful rhombohedral crystals of calcite are described by R. H. Solly,[2] from the Tankerville mine, Shropshire, Eng. They contain only the rhombohedral and scalenohedral faces, with the former predominating. The scalenohedral faces are bright and are covered with little quartz crystals, while the rhombohedral faces contain no quartzes, but are dull and corroded.——Until very recently our knowledge regarding the blue "sulphato-chloride of copper," to which Dana in 1850 gave the name connellite, has been confined to the results of the investigations of Maskelyne[3] and Bertrand.[4] Lately, however, in consequence of the discovery of new material, the crystallography of the mineral has been thoroughly worked up. Connellite occurs in copper veins traversing clay slate and granite in the Camborne district, situated at the west end of the granite boss in which most of the productive tin mines in England occur. The mineral is not found massive, but only in aggregates of minute crystals, the largest measuring from two to four millimeters in length. In crystallization they are hexagonal, containing only the simple forms P, ∞ P2 and ∞ P, in addition to those observed by Maskelyne.——

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[1] Ib., 1885, II, p. 145.

[2] Ib., Beil., Bd. IV, p. 110.

[3] Zeits. d. deutsch. geol. Gesellschaft, XXI, p. 324.

[4] Band I, 1886, p. 62.

[5] From very dilute solutions or from those containing small amounts of gypsum, calcium carbonate is deposited as aragonite, while from concentrated solutions or those containing no foreign matter it is deposited as calcite.

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[1] Comptes Rendus, CII, 1886, p. 273.

[2] Mineralogical Magazine, VI, May, 1885, p. 120.

[3] Philosophical Magazine, January, 1863.

[4] Bulletin de la Soc. Min. de France, 1881, IV.

Guejarite, hitherto known only from Spain, is mentioned by F. Sandberger[1] as occurring at Machacamara, in Bolivia, in radial aggregates in white quartz, associated with barite.——G. F. Kunz announces in a paper in the *American Journal of Science*[2] that the meteorite described by him at the last meeting of the American Association as the Charleston, W. Va., meteorite, fell on Jenney's creek, Wayne county, W. Va., and not, as before stated, at Charleston. It is described as a meteoric iron, made up of crystalline blocks of plessite and kamacite, and belongs to the "grobe Lamellen" of Brezina. An analysis yielded: $Fe = 91.56$, $P = 0.13$, Ni and Co (by difference) $= 8.31$.——The minerals of the region around Stempel, near Marburg, and those of the Erzgebirge have been pretty thoroughly investigated by Stadtländer,[3] of Lüneberg, and Schalch,[4] of Leipzig. The former thinks that the optical anomalies of analcite must be the result of secondary conditions which acted after the crystal had been formed.[5] He finds also twins of Natrolite in which the twinning axis is normal to ∞P and the composition face is the base.——In a little book entitled Die Chemische Natur der Mineralien,[6] Rammelsberg attempts a systematic arrangement of all the minerals, the analyses of which show them to have a constant composition.

MISCELLANEOUS.—Improved methods for the detection of small quantities of silver, chlorine, selenium, sulphur, arsenic, antimony, barium, strontium, lithium and sodium under the microscope, are described by Streng in the last number of the Neues Jahrbuch.[7] The antimony is transformed into antimony chloride; a little of this is evaporated to dryness in an object glass, and the residue moistened with a drop of water holding barium tartrate in suspension and a little barium chloride in solution. On evaporation, little rhombic tables of barium antimony tartrate are found around the edges of the drop. A closer examination of these shows them to possess a monoclinic symmetry, with the forms $0P$, P and $\frac{1}{3} P\infty$ best developed. A practical use of these methods is made in an examination of the composition of rittingerite and pyrostilpnite. The latter is found to be $Ag_3 Sb S_3$, the former $Ag_3 As S_3$ or $Ag_3 As (S. Se)_3$.

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[1] Neues Jahrb. für Min., etc., 1886, I, p. 89.

[2] February, 1886, p. 145.

[3] Neues Jahrb. für Min., etc., 1885, II, p. 97.

[4] Ib., Beil., Bd. IV, p. 178.

[5] Cf. AMERICAN NATURALIST, 1885. March, p. 296; September, p. 886.

[6] Carl Habel, Berlin, 1886.

[7] 1886, I, p. 49.